IN THE CLAIMS:

Please amend the claims as follows:

1. (CURRENTLY AMENDED) A medical signal processing method, comprising the steps of:

receiving, at a processor of a medical device, time-based information corresponding to a defined time interval of a time-based, medical diagnostic signal that has been modulated based on interaction with at least one of tissue and fluid of a patient;

performing, using said processor, a transform on said time-based information to obtain a frequency spectrum defined by a set of nonzero amplitude values, calculated directly from said transform, for a corresponding set of frequencies, said frequency spectrum including a number of said nonzero amplitude values at irregularly spaced frequency intervals, wherein said nonzero amplitude values include a first nonzero amplitude value at a first frequency value and a second nonzero amplitude value greater than said first nonzero amplitude value at a second frequency and said second frequency is a noninteger multiple of each frequency of said set of frequencies other than said second frequency, said step of performing a transform comprising representing said time-based medical diagnostic signal as a series of piecewise function segments; and

operating ~~a~~said processor in a signal processing environment for using said transform to provide an output, including diagnostic information concerning said at least one of tissue and fluid of said patient, based on said time-based, medical diagnostic signal.

2. (ORIGINAL) A method as set forth in Claim 1, wherein said time-based signal includes a component having a period that is longer than said time interval.

3. (ORIGINAL) A method as set forth in Claim 2, wherein said period of said component is at least twice said time interval.

4. (ORIGINAL) A method as set forth in Claim 1, wherein said step of receiving comprises obtaining an input based on a transmitted interrogation signal.

5. (ORIGINAL) A method as set forth in Claim 1, wherein said step of receiving comprises obtaining an input based on a transmitted ultrasound signal.

6. (ORIGINAL) A method as set forth in Claim 1, wherein said spectrum includes first, second and third successive nonzero values associated with first, second and third successive

frequencies, where a difference between said first and second frequencies is different than a difference between said second and third frequencies.

7. (ORIGINAL) A method as set forth in Claim 1, wherein said spectrum defines a substantially continuous function across a frequency range wherein said function has nonzero values for a majority of frequencies of said range.

8. (ORIGINAL) A method as set forth in Claim 1, wherein said step of operating comprises using said spectrum to modify said time-based signal on a frequency dependent basis.

9. (ORIGINAL) A method as set forth in Claim 1, wherein said step of operating comprises using said spectrum to calculate at least one parameter based on said time-based signal.

10. (ORIGINAL) A method as set forth in Claim 1, wherein said time-based signal is an ultrasound signal modulated based on interaction with tissue of an organism including a flow channel and said step of operating comprises determining dimension related information for said flow channel.

11. (ORIGINAL) A method as set forth in Claim 1, wherein said time-based signal is an analog signal and said time-based information is digital time-based information, and said step of performing a transform involves accounting for a digitization error associated with a difference between said analog time-based signal and said digital time-based information.

12. (ORIGINAL) A method as set forth in Claim 11, wherein said digital time-based information comprises a time series of digital values and said accounting involves defining a number of value ranges associated with said digital values, establishing a mathematical model defining a process for deriving said spectrum wherein a given digital value of said series of digital values is allowed to vary within one of said number of value ranges including said given digital value as part of said process, and using said mathematical model to derive said spectrum.

13. (ORIGINAL) A method as set forth in Claim 12, wherein a determination process for determining a specific value of said given digital value within said one value range involves modeling said determination process as a constrained optimization problem.

14. (ORIGINAL) A method as set forth in Claim 13, wherein said optimization problem involves a constraint related to a limit of said range.

15. (ORIGINAL) A method as set forth in Claim 13, wherein said optimization problem involves upper and lower constraints related to limits of said range.

16. (ORIGINAL) A method as set forth in Claim 13, wherein said optimization problem involves a nonnegativity constraint.

17. (ORIGINAL) A method as set forth in Claim 13, wherein said optimization problem involves a constraint related to a limit of said range and a nonnegativity constraint.

18. (ORIGINAL) A method as set forth in Claim 13, wherein said optimization problem includes a constraint related to a peak count within said range.

19. (ORIGINAL) A method as set forth in Claim 13, wherein said optimization problem is defined by a convex objective function.

20. (ORIGINAL) A method as set forth in Claim 13, wherein said optimization problem involves at least one constraint, and said constraint is implemented by one of a penalty function and a barrier function.

21. (ORIGINAL) A method as set forth in Claim 20, wherein said constraint is implemented by a Heaviside function.

22. (ORIGINAL) A method as set forth in Claim 21, wherein said Heaviside function is tapered at an area corresponding to a constraint value such that the function is free from singularities at said area.

23. (ORIGINAL) A method as set forth in Claim 11, wherein said accounting comprises establishing a mathematical model for imposing at least one constraint on a function associated with said spectrum.

24. (ORIGINAL) A method as set forth in Claim 23, wherein said constraint relates to a length of said function within a defined frequency range.

25. (ORIGINAL) A method as set forth in Claim 23, wherein said constraint relates to an area underlying said function within a defined frequency range.

26. (ORIGINAL) A method as set forth in Claim 23, wherein said constraint requires that said function have non-negative values within a defined frequency range.

27.-58. CANCELLED

59. (CURRENTLY AMENDED) A medical signal processing system, comprising:

a port for receiving time-based information corresponding to a defined time interval of a

time-based, medical diagnostic signal; and

a processor for:

1) performing a transform on said time-based information to obtain a frequency spectrum defined by a set of nonzero amplitude values for a corresponding set of frequencies, said frequency spectrum including a number of said nonzero amplitude values, calculated directly from said transform, at irregularly spaced frequency intervals, wherein said nonzero amplitude values include a first nonzero amplitude value at a first frequency value and a second nonzero amplitude value greater than said first nonzero amplitude value at a second frequency and said second frequency is a noninteger multiple of each frequency of said set of frequencies other than said second frequency, said processor being operative for performing said transform by representing said time-based medical diagnostic signal as a series of piecewise function segments, and

2) using said transform to provide an output based on said time-based, medical diagnostic signal.

60. (ORIGINAL) A system as set forth in Claim 59, wherein said port is operative for obtaining an input based on a transmitted interrogation signal.

61. (ORIGINAL) A system as set forth in Claim 59, wherein said processor is operative for accounting for a digitization error associated with a difference between said analog time-based signal and said digital time-based information.

62.-95. CANCELLED